

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Kardauskas, et al.	]	
Serial No.: 10/691,452	]	Examiner: Fick
Confirmation No.: 7331	]	
Filed: 10/22/2003	]	Group Art Unit: 1753
For: DIFFRACTIVE STRUCTURES FOR THE	]	
REDIRECTION AND CONCENTRATION OF	]	
OPTICAL RADIATION	]	

**Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450**

**DECLARATION TRAVERSING REJECTION  
37 CFR 1.132**

To the Commissioner for Patents:

I, Bernhard Piwczyk, being duly sworn, declare as follows:

1. That I am one of the inventors named in the above-captioned patent application.
2. That I have a degree in Chemistry from California State Polytechnic College at San Luis Obispo, CA, obtained in 1966.
3. That I am the Vice President of Research and Development of SunRay Technologies, Inc. of Billerica, MA, the assignee of the above-captioned application.
4. That I am familiar with the claimed invention, namely, diffractive structures for the redirection and concentration of optical radiation.

5. That, on account of my education, position, and experience, I consider myself to be an expert in the field of optics.

6. That the JP '031 reference relates only to diffraction patterns made by mechanical scribing and not by computer-generated patterns. Patterns made by scribing are limited to lines of a selected depth which is continuous from one end of the pattern to the other.

7. That the Applicants' invention as defined in the claims, as amended, differs from the JP '031 reference in that the Applicants' invention substantially eliminates, suppresses, or reduces the zero<sup>th</sup> order diffraction. The Applicant's invention can do this by the making a computer-generated DOE by generating the design of a diffraction pattern and fabricating same by modern fabrication technologies practiced in advanced semiconductor integrated circuited fabrication industry for sub-micron resolution circuitry and the emerging nano-imprint technology instead of a mechanical scribe. This enables the fabrication of three dimensional sub-micron structures having various highly accurate depth profiles required for the fabrication of DEOs having high diffraction efficiencies. A mechanically etched diffraction pattern cannot reduce or eliminate the zero<sup>th</sup> order diffraction because it is made of scribed lines of a particular depth that are continuous. Computer designed DOEs fabricated as described above are not limited in this aspect.

8. That the zero<sup>th</sup> order diffracted light typically represents the majority of the energy of the diffracted light, and is also referred to as the "first order" in the above-captioned application.

9. That the zero<sup>th</sup> diffracted light is not useful for the production of electricity in a solar panel because it is essentially returned in the direction of incidence and therefore will not meet the condition of total internal reflection within a solar panel.

10. That by eliminating the zero<sup>th</sup> order diffraction, the energy is transferred to other diffraction orders that are useful for the production of electricity in a solar panel, thereby greatly increasing the efficiency of the solar panel assembly.

11. That this increase in efficiency is a surprising and unexpected result that could not have been contemplated in the JP '031 reference.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon. Respectfully submitted,

A handwritten signature in cursive script, reading "Bernhard Piwczyk". The signature is written in dark ink and is positioned above the printed name.

BERNHARD PIWCZYK

Date: June 19, 2007  
Tel. No.: ( 603-774-7442 )